

# Spinal Cord Injury SIG



## Fall 2012 Newsletter

### Letter from the Chair

Welcome to our Fall 2012 Newsletter! We hope this letter finds everyone safe during this difficult hurricane season.



Let me begin by saying, “Thank You”, to some of the outgoing members of our SCI SIG. **KJ Hutchinson** Our former Nominating Committee Chair, **Heather Hendersen, PT, DPT, NCS** and **Joy Bruce PT, PhD, NCS** our former Secretary, have both rotated off their positions within our SIG. Heather will continue on the Nominating Committee for the Neurology Section and Joy has agreed to continue to serve as our SIG’s webmaster. Thanks, Joy, and good luck, Heather! In addition, **Erin Culverhouse, PT, DPT, NCS** joins us from Memorial Health in Savannah, GA as a new member of our Nominating Committee and **Marcie Kern, PT** joins us from The Institute for Rehabilitation and Research (TIRR) and is our SIG’s new secretary. Welcome, all!

This past September, I attended the International Spinal Cord Society Meeting (ISCOS) in London, England. At this meeting, ISCOS organizer’s sponsored an opportunity for SCI PTs from around the world to meet and talk about issues relevant to SCI care. I learned that in addition to longer lengths of stay for rehabilitation occurring in ALL other countries noted at the table, most countries also had provisions for follow up PT care post discharge from services. After discharge from PT, patients come back to the PT department for re-checks (e.g. 3 month, 6, month, and/or 12 month post discharge in some instances!). Many countries then have a

yearly follow-up practice which gives the patient a critical opportunity for PT services to update / adjust / prescribe bracing, new exercises or address critical mobility issues relevant to the client which may then lead to a new episode of care. PT ‘re-checks” and a pro-active approach to health promotion/disease prevention following neurologic injury or disease, should be studied and followed. The US significantly falls behind this standard of care, for patients with Neurological disorders, now occurring in many European countries. Patients often want to adopt a healthier lifestyle following their neurological illness or injury, but don’t know where, when or how to exercise. Access to knowledgeable staff and accessible equipment is typically identified as barriers to health promotion efforts in patients with neurological disorders. We will revisit these issues in future newsletters as we try to address the issue of access to health and fitness facilities later next year. Consideration of the need for “routine” Physical Therapy check-ups post-discharge from Physical Therapy Services; similar to a Dental Model of a check up every 6 months, is worthy of further study.

In addition, at this meeting, ISCOS launched its large e-learning initiative. **Lisa Harvey, PT, PhD** from the University of Sydney, Australia, and current chair of the International Spinal Cord Injury Network, presented the electronic PT

#### *To learn more about the E-Learning*

*Project, go to page 6 or see:*

[www.elearnSCI.org](http://www.elearnSCI.org)

module designed to train/educate the PT student or novice clinician. E-learning modules were designed separately for patients and clinicians for individual health disciplines. There are e-learning modules for 7 different categories (PT, Nursing,

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### SCI SIG

#### *Officers:*

- Karen J. Hutchinson, Chair
- SueAnn Sisto, Vice Chair
- Marcie Kern; Secretary
- Twala Maresh, Chair Nominating Committee
- Lauren McCullough, Nominating Com.
- Erin Culverhouse, Nomimanting Com.
- Joy Bruce, WebSite Guru

#### *Inside this issue:*

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## Letter from Chair (cont'd)

Primary Care, etc). Please see page 6 for more exciting details. I especially want to point out the Primary Care Module, which provides a section on what the person with SCI should expect/request with regard to routine Primary Care (Physician) health management.

Finally, regarding the ISCOS Meeting, I want to comment about the host country, England, and make note of the tremendous way in which she celebrated disabled athletes. (The ISCOS meeting was held during the Paralympic games.) There were 3 hours of disabled sports coverage on television each night (similar



London, UK - The start of the WC Marathon. Winner David Weir center. [http://i.telegraph.co.uk/multimedia/archive/02333/DavidWeir\\_GI\\_2333921b.jpg](http://i.telegraph.co.uk/multimedia/archive/02333/DavidWeir_GI_2333921b.jpg)

to the US during the Olympic games), paralympic champions were revered throughout the city, and the sports pages of the local papers were dedicated to the achievements of the paralympians. I live in the Northeastern US and didn't even know when the Paralympic Games were on, never mind a single detail about the range of sports, the competitive categories of athletes, the teams to watch, etc. Television executives fear that programming centered around persons with disabilities will not be watched and thus will not attract advertising dollars. But we lose out on witnessing the incredible athleticism and spirit of competition sustained by athletes with disabilities. I saw some ping-pong matches that were every bit as competitive as their able-bodied counterparts. Please contact your local cable TV

providers to request access to these very exciting games. Our next opportunity is not until the next paralympic games in Rio de Janeiro, Brazil in the Summer of 2016!

Moving On ....

The SCI Pocket Guide on Physical Fitness for Special Populations (SCI) is indeed online! You must be an APTA member to log onto <http://www.apta.org/pfsp/> where you can find all the special populations exercise prescription brochures. There are great suggestions for designing an exercise program that safely progresses your patients with SCI on their

*To learn more about exercise prescription for persons with SCI check out*

<http://www.apta.org/pfsp/>

fitness goals. Be sure to check it out.

A look back.....

In last year's newsletters we discussed determining body composition, identifying total caloric needs and facilitating health behavior change, for persons with spinal cord injury ([www.neuropt.org/go/special-interest-groups/spinal-cord-injury](http://www.neuropt.org/go/special-interest-groups/spinal-cord-injury)). In this newsletter, we are continuing with the health promotion / disease prevention theme and are now focusing on what those calories should come from. The unique challenges to persons with SCI: skin integrity, bone demineralization, and risk of CVD following spinal cord injury, to name a few, further highlight the importance of understanding proper nutrition after SCI. To explain the important contribution of proper nutrition to health and wellness after SCI, we are fortunate to have **Dr. Melissa Shock, RD, PhD** from the University of Arkansas and **Julie Kemp**, a registered dietician from the Baptist Health Medical Center, Little Rock, Arkansas, serve as our expert nutritionists for this newsletter. They have sifted through the mountains of infor-

mation on proper nutritional support for persons with SCI, with a specific focus on weight, pressure ulcers, bowel/bladder and bone health management. They have even developed a recommended one day meal plan. This section of the newsletter has been formatted with the intent that you can print it off and share these pages directly with your patient's and their caregivers. We hope you find this information useful.

Lastly, don't forget that CSM is early this year in San Diego, CA, Jan 21-25, 2013. Programming details are now available on line at <http://www.apta.org/CSM/Programming/>. That's all for now.

Until next time.....

Karen J. Hutchinson  
SCI SIG Chair

\*\*\*\*\*

Sep 3-5, 2012 in Las Vegas, NV



The Academy of Spinal Cord Injury Professionals (ASCIP) is com-

prised of 4 groups: American Paraplegia Society (APS), Association of Spinal Cord Injury Nurses (ASCIN), Psychologists and Social Workers (PSW) and the Therapy Leadership Council (TLC). This group evolved over time and developed its current format in 2009. ASCIP is responsible for the Journal of Spinal Cord Medicine, which publishes articles in the field of spinal cord medicine. The combination of allied health professionals in one setting creates a dynamic venue for collaboration and interaction at the annual meeting. Content presented ranges from current research to clinically relevant applications. It is a good conference for those seeking SCI specific information that is more on the clinical side and not as heavy on the scientific research side. For more information about ways to get involved and for membership check out their website: [www.academyscipro.org/](http://www.academyscipro.org/)  
Contributed by: Marci Kern, PT

## Nutrition Recommendations Following SCI

**Melissa M. Shock, Ph.D., R.D.,  
University of Central Arkansas  
Julie A. Kemp, M.S., R.D., Baptist  
Health Medical Center, Little Rock,  
Arkansas**

Evidence-based nutrition guidelines for individuals with a spinal cord injury (SCI) were developed by the American Dietetic Association in 2008. Weight control, pressure ulcers, cardiovascular disease/lipid abnormalities, neurogenic bowel, and urinary tract infections were addressed. Other issues, including bone health, will be added later.

Nutrition goals for most healthy people are based on the Dietary Reference Intakes (DRI). The DRI is divided into the RDA (Recommended Dietary Allowances), the AI (Adequate Intake), and the UL (Tolerable Upper Intake Levels). Special nutrient needs in SCI require modification of the DRI.

Because of the lowered metabolic rate, kilocalorie (kcal) needs may be estimated using 23 kcal/kg for patients with quadriplegia and 28 kcal/kg for those with paraplegia. For example, a male with paraplegia weighing 165 lbs (74 kgs) would require 2,072 kcals/day (74 kgs x 28 kcal/kg) to maintain his current weight. Regardless of total caloric intake, however, the RDA for **protein** is 0.8g/kg and should **account for at least 20% of total dietary intake**. In SCI, protein needs may vary from .8g/kg to 1.0g/kg for maintenance in the absence of pressure ulcers or infection. So total daily protein intake for our patient noted above would be 542g/day (0.8g/kg x 74 kg). In the acute phase, protein should be calculated at 2.0g/kg. Good protein sources include eggs, meats, poultry, fish, milk products, beans, and soy products. To reduce fat, egg whites, lean meats, and low fat milk products are recommended.

**Carbohydrates** should provide approximately **50% of kcals** per day. Fiber helps weight management and bowel function while lowering the risks of cardiovascular disease (CVD) and type 2 Dia-

betes. Insoluble fiber in vegetables, brown rice, fruits, beans, and seeds helps with bowel function and slows glucose absorption. Soluble fiber in barley, oats, oat bran, rye, and some fruits lower cholesterol and also slow glucose absorption.

**Lipids (fats)**, providing 9kcal/g, are essential for energy, insulation against temperature extremes, protection against shock, and maintenance of cell membranes, all of which are important in SCI. The goal of limiting intake to **30% or less of total kcals/day** may help with prevention of CVD, obesity, and some cancers. Serum cholesterol should be monitored; high LDL is a risk factor for CVD whereas high HDL is protective. Limiting cholesterol, saturated fat and trans fat can help to lower LDL. Cholesterol is only found in animal products (egg yolk, milk products, meat, poultry, and shellfish). Most saturated fat is solid at room temperature; major sources are fatty meats, whole milk products, tropical oils (coconut, palm, palm kernel), and products made from these. Trans fats to be limited are snack foods such as chips, imitation cheeses, foods fried in shortening, and commercially baked goods (cookies, doughnuts, pastries, breads, and crackers).

Monounsaturated fats are highly recommended; olive oil, canola oil, peanut oil, and safflower oil can be used in place of satu-



Dr. Mellissa Shock

rated fats. Other sources are walnuts, flaxseed, and fatty cold water fish (mackerel, salmon, sardines). Polyunsaturated sources are the fatty cold water fish, vegetable oils (sesame, soy, corn, and sunflower), nuts, and seeds. Polyunsaturated fats are good sources of omega-3 fatty acids which may help to prevent blood clots, protect against irregular heartbeat, improve serum lipids, and lower blood pressure. They also support a healthy immune system and suppress inflammation. However, omega-3 *supplements* may increase bleeding time, interfere with wound healing, raise LDL, and suppress immune function.

Vitamin needs can be met with a variety of foods. In SCI, there may be an increased need for vitamins A and C in prevention and treatment of skin breakdown. Caution is required as both are po-

<i>Carbohydrate</i>	<i>50%</i>
<i>Protein</i>	<i>20%</i>
<i>Fat</i>	<i>30%</i>

tentially toxic and attention to the UL is important. Many plant sources, particularly dark green, yellow, and orange fruits and vegetables are sources of vitamins A, C, and fiber. The minerals iron, zinc, and calcium are necessary in prevention and treatment of co-morbidities. Iron and zinc are both in meats and whole grains. Calcium is essential for bone health. Good sources are milk products, green vegetables, canned fish, and fortified foods.

Fluid requirements are based on weight, 30ml/kg to 40ml/kg or 1.0ml/kcal. Needs increase with pressure sores, urinary tract infections, and neurogenic bowel. More research is needed on requirements after spinal cord injury. Water, fruit juice, milk, decaffeinated coffee, and decaffeinated tea are acceptable. Because of the diuretic effect, caffeine containing beverages and alcohol should be avoided.



## Nutritional Guidelines for SCI; Weight Management by MShock and JKemp

For weight control, a realistic goal is a **one to two pound loss per week** for the first six months. To lose one pound, a total deficit of 3500 kcals or 500 – 1000 kcals/day is required. A combination of decreased kcals and increased exercise, if possible, is recommended. Four to five meals/snacks including breakfast should be distributed throughout the day. Consuming the majority of kcals during the day rather than in the evening may be helpful. Portion control in meals and snacks is essential. Meal replacements (e.g., liquid meals, meal bars, calorie-controlled packaged meals) containing

250-300 kcals may be used. Substituting one or two daily meals or snacks with meal replacements can be a successful weight loss and weight maintenance strategy. At least 30 minutes or more of moderate intensity physical activity daily unless medically contraindicated is advised. Wheelchair sports, swimming, electrical stimulation exercise, and body weight supported treadmill training are recommended. Please note that the type of wheelchair used does make a difference in kcals burned.



<http://www.alpineclassic.org/wp-content/uploads/2010/03/fast-weight-loss.jpg>

## Nutritional Guidelines for SCI; Pressure Ulcers by MShock and JKemp

Additional kcals are needed for optimal healing; 30kcal/kg to 40kcal/kg of ideal body weight (or actual weight if they are underweight) per day are recommended. Protein needs increase to 1.2g/kg to 1.5g/kg for Stage II pressure ulcers and 1.5g/kg to 2.0g/kg for Stage III and IV. Two amino acids, arginine and glutamine, and their relationships to wound healing are frequently debated. Recommendations for use have not been established through research but preliminary evidence suggests potential benefits.

Severe pressure ulcers, open wounds, fever, or the use of an air-fluidized bed may require extra fluid. The normal requirement is based on an individual's

weight, 30ml/kg to 40ml/kg/ or 1.0ml per kcal per day. Using air fluidized beds set at a high temperature (more than 31° to 34°C or more than 88° to 93°F) may require an additional 10ml/kg to 15ml/kg. Recommended fluids are water, milk, juice, decaffeinated tea and decaffeinated coffee. Because of the diuretic effect, alcohol and caffeine should be avoided.

Vitamins A, C, iron, and zinc are associated with wound healing. A daily vitamin and mineral supplement with no more than 100% of the DRI is acceptable. Supplements should not exceed the UL because of potential toxicity. Another issue is the cost of unnecessary supplements. Food sources of each should be in the daily meal plan; plant sources of vitamins A and C also provide fiber.

Vitamin A plant sources are green vegetables (spinach, broccoli and other green leafy vegetables), deep orange and yellow fruits (peaches, apricots, cantaloupes) and vegetables (squash, carrots, sweet potatoes, pumpkins). Other sources are fortified milk, cheese, cream, butter, eggs, liver, and fortified margarine.

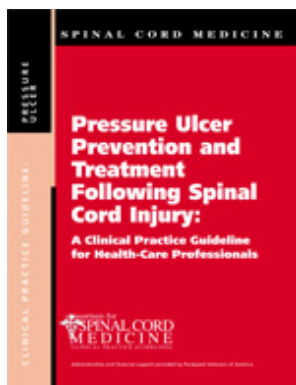
High doses of vitamin C are widely recommended in the literature, 100mg to

200mg/day of vitamin C for Stage I and II and 1000mg to 2000mg/day of vitamin C for Stage III and IV. The UL is 2000 mg/day. Large doses may result in kidney stones, gout, or possible counteracting effects of anticlotting medications. Citrus fruits, cabbage-type vegetables (Brussels sprouts and cauliflower), dark green vegetables (bell peppers and broccoli), cantaloupe, strawberries, and tomatoes are sources.

Zinc replacement therapy guidelines have not been well defined. ZnSo4 220mg (50mg elemental Zinc) twice per day is recommended. High-dose supplementation should be limited to two to three weeks and individualized. Food sources are protein-containing foods including red meats, shellfish, whole grains, and some fortified cereals.

Iron deficiency anemia may require supplementation but potential constipation can be an issue. Red meats, fish, poultry, shellfish, eggs, legumes, and dried fruits are recommended. Absorption of plant sources of iron is not as efficient as animal sources; consuming foods rich in vitamin C at the same time or cooking in an iron skillet can help.

See the **Paralyzed Veterans of America (PVA); Clinical Practice Guidelines on Pressure Ulcer Treatment and Prevention.** Go to [www.pva.org](http://www.pva.org) and search research /



## Nutritional Guidelines; Neurogenic Bowel and UTI by MShock and JKemp

### Neurogenic Bowel

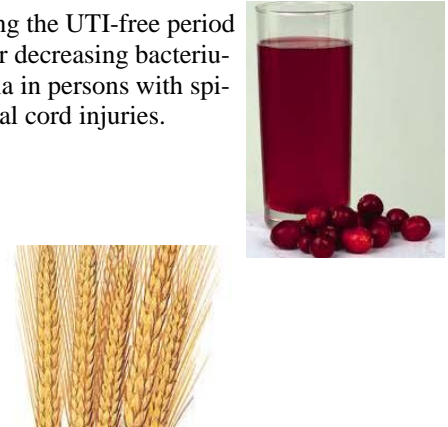
Fluid and fiber are essential. One ml/kcal/day plus 500ml or 40ml/kg plus 500ml is recommended. For our patient case, that comes out to 3.2 liters/day. A minimum of 1.5L/day may promote optimal stool consistency. An initial fiber intake of 15g per day, with gradual increases up to 30g per day of fiber, as tolerated from a variety of sources, is recommended. Significant improvements may be associated with 15g/day. More than 20g/day may be associated with prolonged intestinal transit times. Fiber

should be increased gradually to prevent abdominal discomfort.

### Urinary Tract Infections

In addition to the normal fluid requirement, cranberry juice may reduce UTIs. One cup (250ml) three times daily, may be associated with a reduced urinary tract biofilm load. If weight is an issue, it is important to note that one cup has approximately 120 kcals. Cranberry extract supplements should not be recommended. Evidence suggests that cranberry extract supplements are not effective in prolong-

ing the UTI-free period or decreasing bacteriuria in persons with spinal cord injuries.



Pictures [www.usacranberries.com/](http://www.usacranberries.com/)

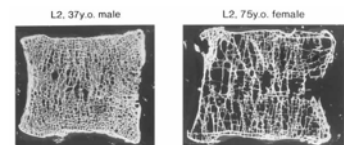
## Nutritional Guidelines; Bone Health by MShock and JKemp

### Bone Health

For prevention and treatment of bone loss, calcium and vitamin D are crucial. Milk products fortified with vitamin D are excellent choices. In lactose intolerance, allergies, or personal preference, cheese or yogurt is recommended. Powdered fat-free milk can be added to casseroles, soups, or other mixed dishes to add calcium, protein, vitamins, and minerals.

Some brands of tofu, tortillas, nuts (almonds) and some seeds (sesame seeds) are options. Mustard and turnip greens, bok choy, kale, parsley, and broccoli are good sources but the calcium in spinach and Swiss chard is not well absorbed. The bones in canned fish (sardines and salmon) may add to the daily intake. Some cereals, mineral waters, and juices fortified with calcium and vitamin D are options but absorption may be an issue. Cal-

cium citrate with vitamin D is the recommended supplemental form.



[http://2.bp.blogspot.com/\\_C2XCzNdR5UQ/5Puu5RQf8A3/AAAAAAAAAEI/UuU0wzDJKf3/s1600/osteoporosis.gif](http://2.bp.blogspot.com/_C2XCzNdR5UQ/5Puu5RQf8A3/AAAAAAAAAEI/UuU0wzDJKf3/s1600/osteoporosis.gif)

## In Conclusion:

Ideally, a registered dietitian should be an active participant of the interdisciplinary team in the acute phase, rehabilitation setting, and community setting. Evidence suggests that medical nutrition therapy provided to patients with spinal cord injuries by a registered dietitian results in improved nutrition-related patient outcomes.

Submitted, By Dr. Melissa Shock and Julie Kemp, MS, RD

### References

American Dietetic Association. (2008). *American Dietetic Association Spinal Cord Injury Evidenced-Based Nutrition Practice Guideline*. Chicago: American Dietetic Association.

Mahan, L.K., Escott-Stump, S., & Raymond, J.L. (2012). *Krause's food and nutrition care process*. St. Louis, MO: Saunders.

### Additional Resources:

<http://www.uab.edu/medicine/sci/uab-scims-information/sci-infosheets>

To find a registered dietitian in your area try: <http://www.eatright.org/programs/rdfinder/>

SAMPLE MEAL PLAN

- Breakfast: 1 cup high fiber cereal (raisin bran, bran flakes, oatmeal)  
 1 cup skim milk (whole milk in pressure ulcers)  
 1 slice of whole wheat toast with  
 1 teaspoon of margarine (or 1 tablespoon of peanut butter if more kcals are needed)  
 1 serving of fruit (banana, orange, or melon)  
 8 ounces of water (minimum)  
 decaffeinated coffee
  
- Snack: 1 serving of fruit (apple, peaches, pears, apricots)  
 6 ounces of Greek yogurt (may be mixed with fruit)  
 8 ounces of water  
 decaffeinated tea
  
- Lunch: 3-4 ounces of turkey breast (baked, broiled, roasted, grilled)  
 1 ounce of lowfat cheese (e.g., mozzarella)  
 2 slices of whole wheat bread  
 lettuce and tomato slices  
 2 teaspoons of low fat mayonnaise (regular mayonnaise if more kcals are needed)  
 1 ounce baked chips  
 ½ cup cottage cheese with 1 cup peaches  
 decaffeinated tea
  
- Snack: 1 high fiber bar  
 1 cup skim milk  
 8 ounces water
  
- Dinner: 3 ounces grilled chicken or fish  
 1 cup pasta  
 ½ cup marinara/spaghetti sauce  
 salad of spinach, mixed greens, carrots, tomatoes  
 (avoid iceberg lettuce, low in nutrients)  
 olive oil and vinegar salad dressing  
 1 whole wheat bread stick  
 1 cup skim milk  
 ½ cup strawberries with a slice of angel food cake and fat free topping  
 8 ounces water  
 decaffeinated tea
  
- Snack: 1/3 cup almonds or 3 cups popcorn, ½ cup dry cereal  
 8 ounces water

By Dr. M Shock and J.Kemp, MS, RD

## Lisa Harvey, PT, PhD Introduces e-learn at ISCOS

Access to this newly developed educational website is free but you must register and log onto the site.

“There are 14 physiotherapy modules with over 1300 screens for users to move through. The modules are primarily written for students and junior clinicians with a strong emphasis on trying to meet the educational needs of those from low resource countries.”

Features:

Case entries from diverse countries with varied equipment access; interactive screens to engage the user; more than 100 videos and 800 photographic images; opportunities for self-assessment.  
**THIS SITE IS NOT TO BE MISSED!**

[www.elearnSCI.org](http://www.elearnSCI.org)





ACRM-ASNR Joint meeting October 9-13, 2012  
 Vancouver, British Columbia, Canada

The ACRM-ASNR (American Congress for Rehabilitation medicine and American Society for Neurologic Research) meeting, is a wonderful conference for those interested in neurologic research. This is an interdisciplinary conference with the opportunity for CEUs for various disciplines in healthcare. This was the last year they had a joint conference between the two associations, so look for conferences next year separately for ACRM and ASNR. ACRM is traditionally more rehabilitation based and ASNR is typically more basic science based. Two great sessions will be briefly described here.

**Plenary Session: SCI Rehabilitation Research in the Great Northwest by Dr.'s Krassioukov, Kwon and Towson.** This program tied together the latest in basic science research, International initiatives by ASIA and ISCoS, and a unique SCI research evidence project. Dr. Krassioukov presented the latest in Autonomic Dysreflexia research and highlighted the importance of assessing and treating the changes which occur in the ANS following SCI and its impact on CV health in SCI. Dr. Krassioukov proposes incorporating assessment for Motor/Sensory completeness as well as ANS completeness by including bowel/bladder function, sexual function, and urodynamic function during classification. He also spoke to the lack of knowledge of our first responders (EMTs/ER MD's) regarding autonomic dysreflexia.

Dr. Kwon spoke about the process of "bench to bedside" research in the SCI population and the obstacles of going from

an animal study to a human study. He introduced a new initiative to better select those studies which would be best suited for progressing to human trials rather than the traditional drug study criteria.

Dr. Townson introduced an international evidence database for SCI, the SCIRE project. This is a web-based database that anyone can access but is designed primarily for healthcare workers. It includes a review of current SCI literature including various levels of evidence from case reports to RCTs. As we all know it is very difficult to design and complete an RCT in the SCI population; this database allows clinicians a quick way to access evidence that has been carefully selected and reviewed allowing for practical evidence based practice. Go to [www.scireproject.com](http://www.scireproject.com) and check it out!

**Health and Fitness Benefits of Functional Electrical Stimulation for People with SCI by Dr.'s TE Johnston, D.Backus, and K. McCully.** This symposium focused on the evidence specific to health and wellness benefits of functional electrical stimulation for neurologic pathologies including cerebral palsy, pediatric SCI, adult SCI. An interesting take home message from this talk was a new study being conducted by Dr. McCully focusing on using new parameters for FES to condition muscle with an approach more in line with endurance training rather than strength training. This approach is showing preliminary data of increased muscle bulk and an increase in intramuscular mitochondrial function. If you are going to CSM this year, keep an eye out for programming about FES and the health and wellness benefits!

Contributed by: Lauren McCollough

## Journal Article Review: Calorie and macronutrient intake in people with SCI: An analysis by sex and injury-related variables. By H Sabour et al, Nutrition; 2012;28:143-147.

N=162

The authors state that up to 2/3 of the SCI population may be at risk for suffering the negative consequences associated with obesity. The purpose of this study was to compare the dietary intakes of people with SCI according to sex, age and injury severity; and compare these values to national guidelines.

**This study was completed at the University of Tehran**

The Food Frequency Questionnaire was completed during a face-to-face one hour interview. Caloric intake for males (2,032kcal) was greater than for women (1,839 kcal). No other differences in caloric intake were observed between groups for sex and injury severity. Overall, carbohydrate, protein and fat intake was 53%, 10% and 37% respectively for men, and 52%, 11% and 39% respectively for women.

The authors conclude that there is a macronutrient shift toward an increase in fat and (simple) carbohydrates at the expense of adequate protein intake post SCI.

Greater time post injury was associated with improved total caloric, fat and cholesterol intake.

\*Consider the importance of protein intake. In this study, it was found that persons with SCI typically consumed only about half of the recommended daily allowance for protein.